

Total No. of printed pages = 5

END SEMESTER EXAMINATION-2019

Semester : 4th

Subject Code : Ch-403

FUELS, FURNACE AND REFRACTORIES

Full Marks – 70

Time – Three hours

The figures in the margin indicate full marks for the questions.

Instructions :

1. All questions of PART – A are compulsory.
2. Answer any five questions from PART – B.

PART – A

Marks – 25

1. Fill in the blanks : 1×10=10

(a) A ——— is basically a source of heat.

(b) ——— is inorganic residue left when the fuel is completely burnt in air.

(c) Cetane number is desirable for ——— fuel.

[Turn over

- (d) Unit of dynamic viscosity is _____.
- (e) Main components of LPG are _____ and _____.
- (f) One example of acidic refractory is _____.
- (g) Cloud point is important for _____ fuel.
- (h) _____ coal has highest calorific value.
- (i) Aromatic content increases the _____ number.
- (j) Blast furnace is used in _____ industry.

2. Write true or false :  1×5=5

- (a) Pour point is the temperature at which a fluid ceases to flow.
- (b) ASTM stands for American Standard for Testing of Minerals.
- (c) CNG is obtained from natural gas.
- (d) Composition of Producer gas is CH_4 and H_2 .
- (e) The first stage of coal is peat.

3. Define the following : 1×5=5

- (a) API gravity
- (b) Char value
- (c) Cloud point
- (d) Octane number.
- (e) Diesel index.

4. Choose the correct option : 1×5=5

- (a) Pensky-Martin apparatus is used for measuring Flash point / Viscosity.
- (b) With increase in oxygen content the calorific value of coal increases / decreases.
- (c) Mercaptans / Salts make the crude sour.
- (d) The upward migration of crude is prevented by Reservoir rock / Cap rock.
- (e) Natural gas mostly contains Methane / Butane.

PART – B

Marks – 45

5. (a) Describe the two stages of distillation of crude oil with neat flow sheet. 5
- (b) Define visbreaking, viscosity index, fire point and pulverisation. 4

6. (a) Write briefly about the theories behind the origin of coal. 4
- (b) Describe the methods of analysis of coal. 5
7. (a) Write briefly about various renewable energy sources. 5
- (b) What are the advantages of renewable energy over conventional energy? 4
8. (a) Describe briefly about the general manufacturing process of refractories. 5
- (b) Describe the construction of blast furnace with neat diagram. 4
9. (a) Describe the production of producer gas with neat diagram. 5
- (b) Write short notes on any two : $2 \times 2 = 4$
- (i) Muffle furnace
 - (ii) Water gas
 - (iii) LPG.

10. (a) Classify refractories based upon their chemical nature. 5

(b) Define knocking. How can this be prevented? 2

(c) What are pour and cloud point? 2

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